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| **Hardy Weinberg Equilibrium Cheat Sheet**  Ms. Ottolini, AP Biology  **Definition of Hardy Weinberg Equilibrium:**  H-W Equilibrium describes a population that is NOT evolving. Therefore the allele frequencies for that population are not changing from generation to generation.  **The Two Hardy Weinberg Equations:** If a population is in Hardy Weinberg Equilibrium, the following equations should be true.   |  |  | | --- | --- | | ***Allele Frequency Equation*** | p + q = 1 | | ***Genotype Frequency Equation*** | p2 + 2pq + q2 = 1 |   **Meanings of All Terms: Identifying “Given” and “Asked For” Information:**  ***Sample Problem:*** In a population of 2,000 earthworms, there is a condition governed by a recessive allele where the worms do not have any setae. Setae are tiny hair-like projections needed by the worm to move through the ground. 500 worms were found not having setae. What is the frequency of the dominant allele in this population?  ***Identify the given information***: frequency of the recessive phenotype = q2 = 500/2,000 = 0.25  **Identify required information:** frequency of the dominant allele = p  **Steps to solve the problem:**   1. Take the square root of q2 to find q 2. Use p+q = 1 to find p  |  |  | | --- | --- | | ***Term*** | ***Meaning*** | | p | Frequency of the dominant **allele** (A) | | q | Frequency of the recessive **allele** (a) | | p2 | Frequency of the homozygous dominant **genotype** (AA) | | 2pq | Frequency of the heterozygous **genotype** (Aa) | | q2 | Frequency of the homozygous recessive **genotype** (aa) | | p2 + 2pq | Frequency of the dominant **phenotype** (sum of the frequencies AA and Aa) | | q2 | Frequency of the recessive **phenotype** (since only one genotype—aa—can give you the recessive phenotype) | |
| **Hardy Weinberg Equilibrium Cheat Sheet**  Ms. Ottolini, AP Biology  **Definition of Hardy Weinberg Equilibrium:**  H-W Equilibrium describes a population that is NOT evolving. Therefore the allele frequencies for that population are not changing from generation to generation.  **The Two Hardy Weinberg Equations:** If a population is in Hardy Weinberg Equilibrium, the following equations should be true.   |  |  | | --- | --- | | ***Allele Frequency Equation*** | p + q = 1 | | ***Genotype Frequency Equation*** | p2 + 2pq + q2 = 1 |   **Meanings of All Terms: Identifying “Given” and “Asked For” Information:**  ***Sample Problem:*** In a population of 2,000 earthworms, there is a condition governed by a recessive allele where the worms do not have any setae. Setae are tiny hair-like projections needed by the worm to move through the ground. 500 worms were found not having setae. What is the frequency of the dominant allele in this population?  ***Identify the given information***: frequency of the recessive phenotype = q2 = 500/2,000 = 0.25  **Identify required information:** frequency of the dominant allele = p  **Steps to solve the problem:**   1. Take the square root of q2 to find q 2. Use p+q = 1 to find p  |  |  | | --- | --- | | ***Term*** | ***Meaning*** | | p | Frequency of the dominant **allele** (A) | | q | Frequency of the recessive **allele** (a) | | p2 | Frequency of the homozygous dominant **genotype** (AA) | | 2pq | Frequency of the heterozygous **genotype** (Aa) | | q2 | Frequency of the homozygous recessive **genotype** (aa) | | p2 + 2pq | Frequency of the dominant **phenotype** (sum of the frequencies AA and Aa) | | q2 | Frequency of the recessive **phenotype** (since only one genotype—aa—can give you the recessive phenotype) | |